LEC 07

CSE 121

Methods, Parameters, Returns

BEFORE WE START

Talk to your neighbors:

Is cereal a soup?

Music: CSE 121 25au Lecture Tunes

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TAs:

Trey	Ava	Caleb	Elden	Anya
Amogh	Reese	Anum	Suyash	Minh
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Ailsa	Spencer	Navya	Shayna	Cayden
Ryan	Savannah	Sam	Jesse	Johnathan
Anant	Tamsyn	Jessica	Nhan	

Questions during Class?

Raise hand or send here

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Agenda

- **Announcements, Reminders**
- P1 Preview
- Revisiting Class Constants
- More Methods!

Announcements, Reminders

- **P1** is out, due next Tuesday, October 21st
  - start early – this one is tough!
- **R1** released yesterday, due Thursday October 23rd
- **Quiz 0** was yesterday
  - grades will be out before Quiz 1

C1 ASCII Art Creations: Cats (+ Friends)

```
Task 1:A happy alpaca
           |\   /|
           | · x · |
\________/        |
|                 |
 \_____________/
   /        /
```

```
Task 2: Three cats holding a star
 /\___/\
(=0 . 0=)
/  >*<  \

 /\___/\
(=0 . 0=)
/  >*<  \

 /\___/\
(=0 . 0=)
/  >*<  \
```

```
Task 1: A cat!
__^____^__

| o    o |
|=   w  =|
__________
```

```
() ()
(oto)
(u u)@
```

```
Task 1: Curtis the Cautious Cat!
 ^______^
 / '    ' \
>\    '    /<
  |_  ^  _|
```

```
Task 1: a grumpy cat!
^   ^
 . .
_ ^ _
 ___
```

```
Creative Option 2: Tummy Troubles
As mr. monkey eats bananas, his stomach starts to stretch...
The lengths are often random so he's always full of dread :(
 / \
c ..
(( o)<_)
----- ||
/   \//
|    |
|    |
|    |
|    |
|    |
|    |
|    |
monkey ate 7 bananas
```

```
Task 1: Betty the bunny
/)/)
(..)
(  )
 UU
```

```
Task 1: a bunny!
()()
(- -)
o(0)
```

```
Task 3: 3 cats!!!
  /\___/\        /\___/\        /\___/\
 =       =      =       =      =       =
*|  0   0  |* *|  0   0  |* *|  0   0  |*
*=    V    =* *=    V    =* *=    V    =*
 *|  -^-  |*   *|  -^-  |*   *|  -^-  |*
   \     /       \     /       \     /
```

```
Task 1: A very round cat!
  _/\__/\_
 / -0-0-   \
|  --   --  |
\ v------vv /
```

```
Task 1: An owl
(\_._/).
 (o>o) .
(|^^^|).
--m-m--.
```

```
Task 1: A staring cat.
 ^ _ ^
= 0+0 =
 ==o==
|\   /|
 -u-u- ___//]
```

```
Task 1: A Cutesy piggie
   _____
 ^..^    \9
 (oo)_____/
   WW   WW
```

```
Task 3: The rabbit-like creature family photo
 n n      n n      n n      n n
 (^^)     (^^)     (^^)     (^^)
  ()       ()       ()       ()
 *  *     *  *     *  *     *  *
```

```
Task 1: A liitle mouse
/\__/\
(. . )      ~
|-.-- \   /
|^  ^  \/
----------
```

```
Task 1: A bunny!
 () ~ ()
( ' * ' )
  ~~~~~
( U   U )
```

```
 .^.
 -|-
 -\-  /
```

```
Creative Option 1: cat phalanx
  *     *      *     *      *     *      *     *
 * *   * *    * *   * *    * *   * *    * *   * *
*   ***   *  *   ***   *  *   ***   *  *   ***   *
*  @   @  *  *  @   @  *  *  @   @  *  *  @   @  *
*    ^    *  *    ^    *  *    ^    *  *    ^    *
* * * * * *  * * * * * *  * * * * * *  * * * * * *

  *     *      *     *      *     *      *     *
 * *   * *    * *   * *    * *   * *    * *   * *
*   ***   *  *   ***   *  *   ***   *  *   ***   *
*  @   @  *  *  @   @  *  *  @   @  *  *  @   @  *
*    ^    *  *    ^    *  *    ^    *  *    ^    *
* * * * * *  * * * * * *  * * * * * *  * * * * * *
```

```
                _
               /.>
              / /
             / /
            / /
           / /
          / /
         / /
        / /
       / /
      / /
     / /
    / /
 _________/ /
<__________/
           \_
```

```
Task 3: 3 ASCII arts of a small simple creatures with round triangular bodies and
pointy triangular ears, holding a flower stem, repeated horizontally)
✿/\_/\    ✿/\_/\    ✿/\_/\
 /\◉.◉ \   /\◉.◉ \   /\◉.◉ \
( ɔ\c   ) ( ɔ\c   ) ( ɔ\c   )
-------   -------   -------
```

```
Creative Option 1: a cluster of 9 frogs
 @..@     @..@     @..@
(----)   (----)   (----)
( >__< ) ( >__< ) ( >__< )

 @..@     @..@     @..@
(----)   (----)   (----)
( >__< ) ( >__< ) ( >__< )

 @..@     @..@     @..@
(----)   (----)   (----)
( >__< ) ( >__< ) ( >__< )
```

```
Creative Option 2: a small simple creature with a round triangular body
triangular ears, that is a random number (17) characters wide, holding
✿/\_________/\
 /\◉_________◉ \
( ɔ\c            )
----------------
```

```
Task 3: Birds on the ground
   _         _         _         _
  /.>       /.>       /.>       /.>
____/ /   ____/ /   ____/ /   ____/ /
<_____/   <_____/   <_____/   <_____/
  \_        \_        \_        \_
```

```
Task 3: A line of 3 birds!
  ___        ___        ___
 (o o)      (o o)      (o o)
 (  v  )    (  v  )    (  v  )
//-m--m--  //-m--m--  //-m--m--
```

```
Task 1: A penguin
  _ _ _
 /     \
 | '  ' |
 \___v___/
 |_|_|_|_|_|
 / / |__| \
 \_/ |__|\_/
  \_______/
   vv    vv
```

```
 \_______/
 /•       •\
/   _____   \
|  /     \   |
\  \ _|_ /   /
 |   / \    |
```

```
Task 3: FIVE HIPPOS WHAT IS GOING ON
 @_____@    @_____@    @_____@    @_____@    @_____@
(0      0) (0      0) (0      0) (0      0) (0      0)
(   O O  ) (   O O  ) (   O O  ) (   O O  ) (   O O  )
---------  ---------  ---------  ---------  ---------
```

C1 ASCII Art Creations: Robots (+ Friends)

Task 1: ASCII Robot

```
 |_|
[o o]
 :.:
{ooo}
 / \
```

Task 1: A hopefully friendly robot?

```
 _|__|_
|o  o|
|_==_|
```

Task 3: Five horizontal cakes

Creative Option 2: Chef with random size hat!

```
  _____
 (     )
  |   |
  |   |
  |   |
  |___|
    O
   /|\
    |
   / \
```

Task 1: Man with very big eyes

```
#####
[0 0]
  -
 -|-
  |
  /\
```

Task 1: dragon ASCII art

```
 __)\ (\__/) /(__
__)_ \(6`'6)/ _(__
 )__   \oo/   __(
  )_ `/(  )\ '_(
    \(_>UU<_)/
```

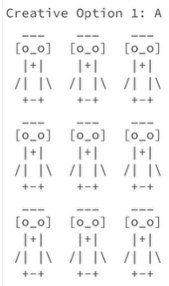
Task 1: a snowman!

```
      (   )
     (.   .)
  |   (   ><  )
 ---(         )---
   ((         ))  |
   ((         ))
     ----------
```

Task 1: Calcifer the Flame

```
          /\
         /  \
        /    \
   /\  /      \
  /  \/        \
  |  (0)    (0) |
   \  -___-___-  /
```

Task 1: A collection of robots



Task 1: I create a little elf with eyes mouth and blush

```
---^-----^--
| / ì   í \ |
|/@    ^   @\|
----->0<----
```

Task 1: a lovely framed photo of a mountain range.

```
o-----o
|  o  |
|^v^v^|
o-----o
```

Task 1: This is a drawing of dancing squidward

```
    ⌒  ⌒
   ( 0  0 )
    --J--
ᵛ^ᵛ^ᵛ^||ᵛ^ᵛ^ᵛ^
   __|_)__
   \     /
  --     --
```

Task 1: Plankton from Spongebob

```
  o   o
   \_/
\ ( 0 ) /
 \|   |/
  (   )
   ---
   | |
```

Creative Option 2: Man with random length neck

```
  _
 /.\
  -
  |
  |
  |
  |
  |
--|--
  |
  -
 / \
```

```
 ^^^^^
<     >
 -----
  ! !

 ^^^^^
<     >
 -----
  ! !
```

Task 3: A line of 3 cups of coffee

```
 ( (      ( (      ( (
  ) )      ) )      ) )
  ....     ....     ....
 |    |]  |    |]  |    |]
 \____/   \____/   \____/
```

Up Next: P1 Preview

- Announcements, Reminders
- **P1 Preview**
- Revisiting Class Constants
- More Methods!

Up Next: Class Constants

- Announcements, Reminders
- P1 Preview
- **Revisiting Class Constants**
- More Methods!

New: Class Constants

A fixed value visible (in-scope) to the whole program (the entire ***class***).

Value is set at declaration, **cannot** be reassigned – value is ***constant***.

```
public static final type NAME_OF_CONSTANT = expression;
```

Practice: Think

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```
public static final int COUNT = 7;

public static void main(String[] args) {
  int count = 5;
  line(count);
  System.out.println("COUNT is: " + COUNT);
  System.out.println("count is: " + count);
}

public static void line(int count) {
  for (int i = 1; i <= count; i++) {
    System.out.print("*");
  }
  count++;
  System.out.println();
}
```

What will be the **last line of output** from this code?

A. `count is: 1`

B. `count is: 5`

C. `count is: 6`

D. `count is: 7`

Practice: Pair

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```
public static final int COUNT = 7;

public static void main(String[] args) {
  int count = 5;
  line(count);
  System.out.println("COUNT is: " + COUNT);
  System.out.println("count is: " + count);
}

public static void line(int count) {
  for (int i = 1; i <= count; i++) {
    System.out.print("*");
  }
  count++;
  System.out.println();
}
```

What will be the **last line of output** from this code?

A. `count is: 1`

B. `count is: 5`

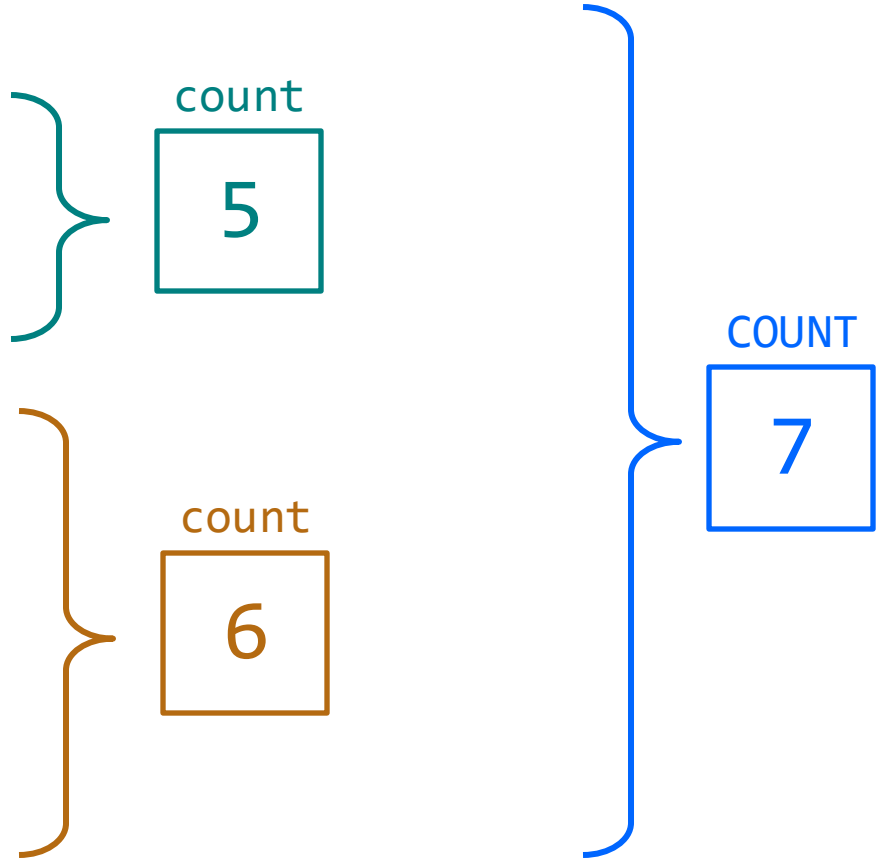
C. `count is: 6`

D. `count is: 7`

Walkthrough: Counting Counts

```
public static final int COUNT = 7;
public static void main(String[] args) {
  int count = 5;
  line(count);
  System.out.println("COUNT is: " + COUNT);
  System.out.println("count is: " + count);
}

public static void line(int count) {
  for (int i = 1; i <= count; i++) {
    System.out.print("*");
  }
  count++;
  System.out.println();
}
```



Up Next: More Methods!

- Announcements, Reminders
- P1 Preview
- Revisiting Class Constants
- **More Methods!**

PCM: Returns

Returns allow us to send values *out of a method*

```
public static <type> myMethod(int num) {
    System.out.print(num + " is the best!");
    ...
    return <value of correct type>
}
```

`return` does 3 things:

1. **Evaluate** the expression
2. **Return** this value to where the method was called
3. **Exit** the method

Calling a method that returns a value…

```
<type> result = myMethod(42);
```

Recall: Math

Method	Description
`Math.abs(`*value*`)`	**Returns** the absolute value of *value*
`Math.ceil(`*value*`)`	**Returns** *value* rounded up
`Math.floor(`*value*`)`	**Returns** *value* rounded down
`Math.max(`*value1*`, `*value2*`)`	**Returns** the larger of the two values
`Math.min(`*value1*`, `*value2*`)`	**Returns** the smaller of the two values
`Math.round(`*value*`)`	**Returns** *value* rounded to the nearest whole number* note: need to cast result to int (it's complicated!)
`Math.sqrt(`*value*`)`	**Returns** the square root of *value*
`Math.pow(`*base*`, `*exp*`)`	**Returns** *base* raised to the *exp* power

Recall: String Methods

Method	Description
`length()`	**Returns** the length of the string.
`charAt(i)`	**Returns** the character at index *i* of the string
`indexOf(s)`	**Returns** the index of the first occurrence of *s* in the string; returns -1 if *s* doesn't appear in the string
`substring(i, j)` or `substring(i)`	**Returns** the characters in this string from *i* (inclusive) to *j* (exclusive); if *j* is omitted, goes until the end of the string
`contains(s)`	**Returns** whether or not the string contains *s*
`equals(s)`	**Returns** whether or not the string is equal to *s* (case-sensitive)
`equalsIgnoreCase(s)`	**Returns** whether or not the string is equal to *s* ignoring case
`toUpperCase()`	**Returns** an uppercase version of the string
`toLowerCase()`	**Returns** a lowercase version of the string